

# Scheme for Improved Optical Measurements Will Lead to Better X-ray Mirrors

## Scientific Achievement

Used a very high precision wavefront sensor as the basis for an optical head for taking highly accurate measurements of the slope error of x-ray mirrors

## Significance and Impact

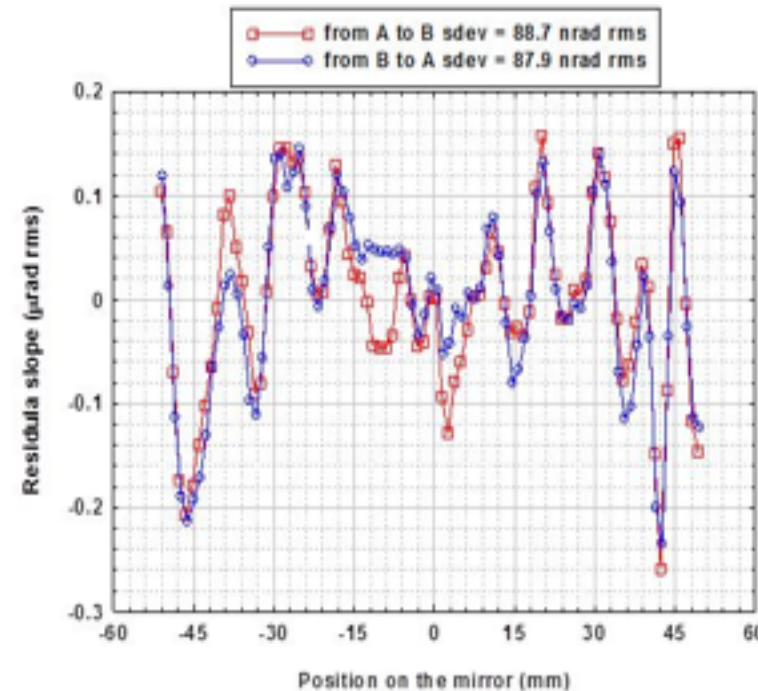
This approach will lead to improvements in x-ray mirrors for premier research facilities like NSLS-II

## Research Details

- At the NSLS-II Optical Metrology Lab, researchers created a new tool, the Stitching Shack Hartmann Optical Head (SSH-OH), for measuring the slope error of x-ray mirrors, which is one way to gauge mirror quality
- SSH-OH, based on a Shack Hartmann sensor, is designed to measure beam wavefronts and creates a 2D slope error map
- Main components: a highly precise sensor, very sensitive positioning system, and robust, full-featured metrology software; benefits include no contact with mirror and the yield of a fast 2D map
- Tests on different mirrors show that it is fast and returns consistent results; tests showing different slope errors along two directions on the same mirror show importance of measuring slope error in 2D

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Work was performed at  
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Measurements taken by the SSH-OH forward and backward along the same line, demonstrating high repeatability